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Working for Clean Water

An Information Program for Advisory Groups

Industrial Pretreatment

Are there any industries discharging into the public sewer system? Can the community benefit by industrial joint treatment or pretreatment using a publicly-owned treatment works? Does your community have industrial pretreatment effluent standards and regulations? Has the public had input into the pretreatment standards and regulations?

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Citizen Handbook

EP 1.8/12:

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Graphics support was provided by the Office of Public Awareness, U.S. Environmental Protection Agency.

Industrial Pretreatment

Is there an industry in your municipality that discharges manufacturing wastes into the sanitary sewer system? Do toxic industrial wastes complicate the operation of your wastewater treatment plant? Is industry failing to pay for its fair share of the treatment plant operating costs?

If the answer to any of these questions is yes, this discussion is for you.

Business is an important part of America's lifestyle. Although it makes possible a high material standard of living, it can produce wastes which are toxic to both surface waters and treatment plants. Each of these three systems (business, surface waters, and treatment plants) is sensitive in its own way to various influences. A healthy society needs all of them. The problem is to manage them together. The issues to be addressed in this balancing are:

- Roles of local, state, and federal governments
- Safety factors built into waste disposal systems
- Effective regulatory agencies
- Long term administrative and financial commitments by regulatory agencies.

The public has several concerns about industrial wastes. They include:

- Environmental impacts of land uses
- Groundwater pollution from industrial wastes
- Air pollution and odors
- Noise
- Silting and sludge disposal
- Safety and health.

These important concerns can be dealt with in several ways.

Industrial Waste Treatment Options

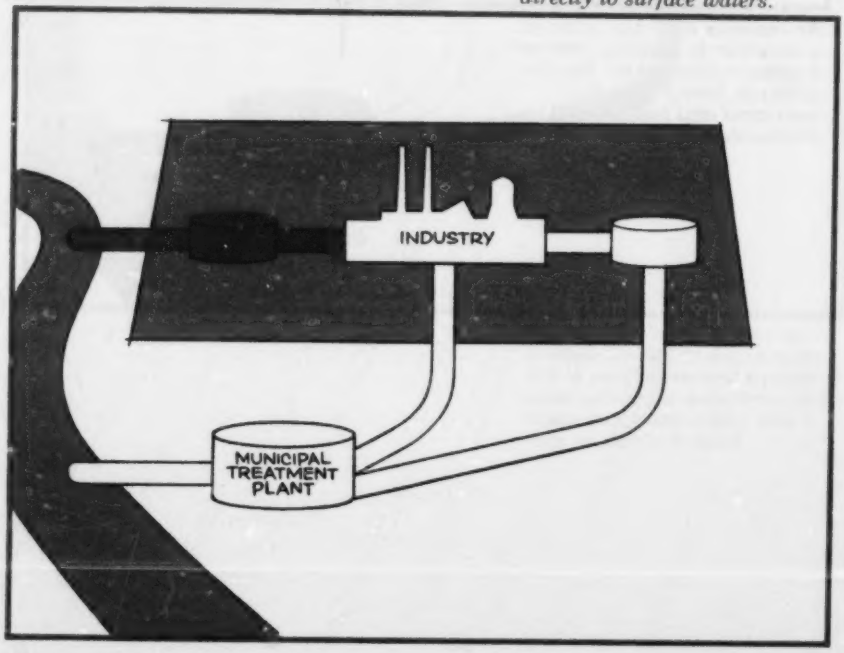
Industry has three major options in treating and disposing of industrial wastewaters:

1. Treat the wastewater in its own facility, and discharge it directly into the receiving waters (direct discharge)

2. (indirect discharge, joint treatment) publicly-owned treatment works that can treat both industrial and municipal wastewaters (joint treatment, indirect discharge)

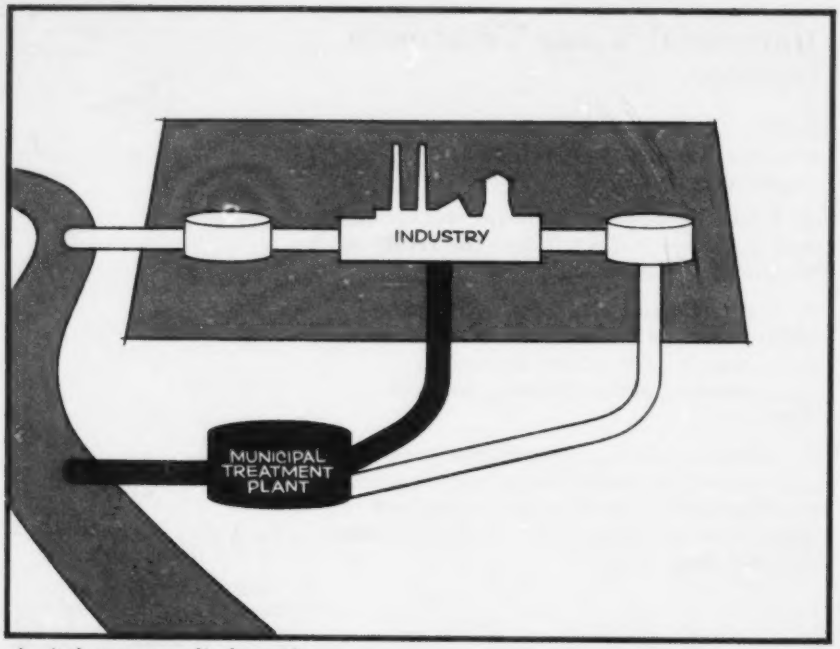
3. (indirect discharge, joint treatment) pollutants that would cause problems with the municipal treatment processes, and then discharge them to the municipal plant for joint treatment.

An industry may treat its own wastewater and discharge it directly to surface waters.



Direct Discharge

If an industry treats and discharges its wastewaters in its own facilities, it must obtain a National Pollution Discharge Elimination System (NPDES) permit. It will be responsible directly to the regulatory agency in meeting the conditions of the permit. Therefore, pretreatment regulations are unnecessary and inappropriate for plants that treat only sanitary wastewaters.



An industry may discharge its wastewater to a publicly-owned treatment plant which has the ability to jointly treat the municipal and industrial wastewaters.

Indirect Discharge (Joint Treatment)

The other two options involve the joint treatment of municipal and industrial wastes. With joint treatment, an industry can discharge its wastewater to the municipal treatment plant for total processing, *or* it can first pretreat its waste and then discharge to the municipal plant for final processing. In both cases, industrial wastes are considered to be directly discharged to the receiving water, since the final treatment occurs in the municipal plant.

Joint treatment has advantages for both the municipality and the industry. The economy of scale in building a larger plant can reduce capital and operating costs. Administrative costs are lowered by the reduced number of direct discharges. Land resources are used more efficiently. Also the treatment processes may have increased reliability and flexibility.

The main disadvantage of joint treatment without first pretreating the industrial waste is that some industrial pollutants interfere with treatment processes in the municipal plant. Cyanide is an example of a pollutant that is toxic to microorganisms used in biological treatment methods. Treatment plant processes can be overloaded by an excess of organic matter or suspended solids. Certain toxic pollutants, such as the metal cadmium, cause the sludge to be unsuitable for land disposal. Still other pollutants, such as chlorides, pass through the treatment plant without causing interference, but violate water quality standards for receiving waters. All of these pollutants are said to be incompatible with, or to upset, treatment processes.

The NPDES permit for an indirect discharge is issued only to the municipality which has the responsibility to see that industrial pollutants do not cause the permit to be violated. A well-conceived pretreatment program can assist the municipality with this responsibility. A program which requires an industry to pretreat its wastes will protect the municipal treatment plant and sewers from incompatible wastes. It will also allow the municipality to prosecute an industry that continuously or intermittently discharges incompatible wastes.

The Pretreatment Program

Legislation enacted by Congress requires the United States Environmental Protection Agency (EPA) to see that effective pretreatment programs are established. The EPA mandate involves two actions:

- Establish pretreatment effluent standards for industrial wastes, paying particular attention to toxic pollutants
- Require certain municipalities to develop local pretreatment programs capable of enforcing the national and local pretreatment standards.

Pretreatment Effluent Standards

The EPA is developing industrial pretreatment standards for specific toxic pollutants. These standards concentrate on about 125 priority pollutants in 34 industrial categories. The standards are uniform for a particular industrial category, and thus are called categorical standards.

Effluent standards for prohibited pollutants apply to all industries. Although these prohibited discharge standards are general, municipal pretreatment programs must have specific local prohibitive limits. This is to protect wastewater treatment plants from interference by the pollutants.

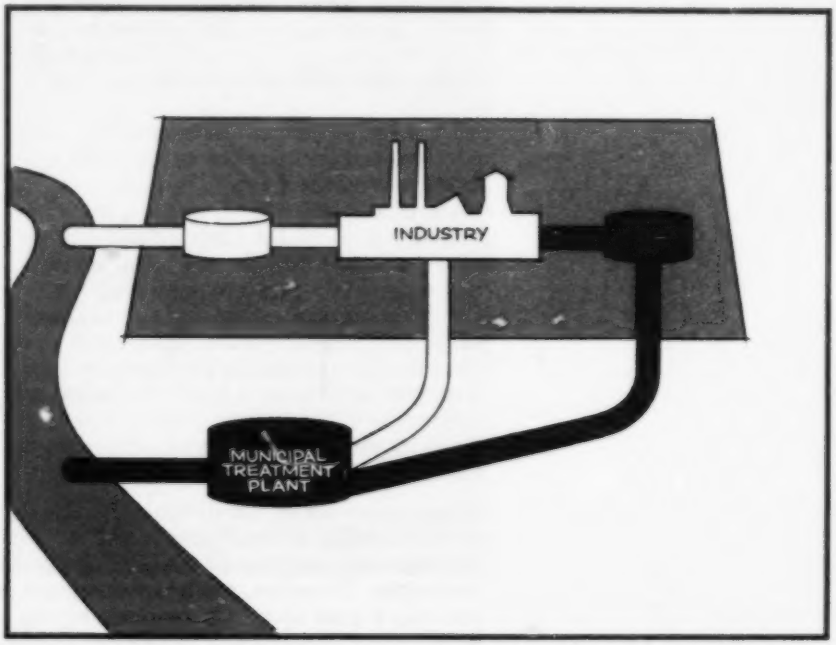
Pretreatment Regulations

Pretreatment regulations have been in effect since mid-1978 as the EPA General Pretreatment Regulations (40 CFR Part 403). These regulations were proposed again in October 1979. They establish the framework for municipal standards. They specifically:

- Apply whether or not the municipal wastewater treatment plant is federally funded
- Contain prohibited discharge standards to prevent the introduction of substances which are hazardous, dangerous, and otherwise incompatible with treatment plants
- Require the EPA to have certain municipalities develop local pretreatment programs
- Describe minimum requirements for local programs and approval procedures
- Describe industrial responsibilities under categorial pretreatment standards
- Outline the rules whereby industry may receive credit for removal of pollutants in the municipal treatment plant.

The development of a pretreatment program is eligible for 75 percent federal funding with both 201 and 208 grants. The pretreatment program was to be developed as part of 208 planning, but since regulations were published at a late date, it was made an eligible cost in 201 grants for all steps of the Construction Grants Program.

The proposed pretreatment effluent standards and the general pretreatment regulations are very recent actions of the EPA. These areas have been challenged in the courts. Further litigation will probably occur. Therefore, changes in both areas are expected. Consulting engineers should be familiar with the most recent information.



An industry may pretreat its wastewater before discharging it to a publicly-owned treatment plant where the industrial and municipal wastewaters will then be jointly treated.

Program Requirements

Approval of a pretreatment program by the EPA requires these actions:

- Community involvement is encouraged
- Local legal authority is established and evaluated
- Procedures for compliance with the program are developed
- Resources to carry out the program are obtained
- An organizational structure is developed
- An industrial waste survey is conducted
- If desired, the authority to revise categorical standards is obtained
- Variances from categorical standards, because of unusual manufacturing processes, are sometimes determined
- A detailed description of the pretreatment program is submitted to a regulatory agency for review.

Community Involvement

An important element in a successful and effective pretreatment program is its credibility in the community. The involvement of both the public and industry is essential. Local considerations play an important role in administering and enforcing a pretreatment program. Open communication among the various participants fosters trust. Active and informative community involvement can minimize enforcement conflicts. Industrial awareness of the nature, intent, and sincerity of the pretreatment program can encourage cooperation.

Before approval by the control authority, as a minimum, a description of the pretreatment program is made available to the public. Therefore, public involvement is not only a good idea; it is required by the EPA.

The following techniques can be used to develop and maintain the program:

- Public workshops
- Industrial meetings
- Advisory committees
- Mailing lists
- Media such as newspapers, television, and brochures
- School educational programs.

Advisory Group Questions in Facility Planning

1. Assessing Current Situation

What industrial users do we have?
What other industries do we have?
How much treatment capacity do they need?
What problems might they cause?

2. Assessing Future Situation

What industries are expected to move into the area?
What expansion is anticipated for existing industries?
How much treatment capacity is needed? When is it necessary?
What problems might they cause?

3. Identifying Alternatives

What alternatives provide maximum benefits to the community as a whole?

4. Evaluating Alternatives

What are the impacts and potential problems of the industrial wastes on the effluent, on the sludge, and on the environment?

5. Selecting Plan

Do we have satisfactory pretreatment standards and regulations?
Do these plans include adequate personnel and equipment to implement the regulations?
Are these plans adequately funded through a local revenue system?

Legal Authority

The municipal treatment agency operates a pretreatment program under local legal authority. This legal authority may take the form of statutes, ordinances, contracts, agreements, or other legal documents. It must be binding upon industrial users, enforceable under contract law or police powers, and at a minimum should allow the municipal plant to:

- Deny or place conditions on discharges
- Require compliance with pretreatment standards
- Require an industrial compliance schedule for required technologies
- Require industries to submit self-monitoring reports so that compliance can be assessed
- Conduct inspections, surveillance, and monitoring to determine compliance or non-compliance. Access to industrial records and entry to any industrial users' premises must also be allowed
- Independently assess or recover through judicial action: fines, penalties, or injunctive relief damages for non-compliance by the industrial users
- Immediately and effectively eliminate any discharge of pollutants to the municipal treatment plant which endanger the health and welfare of the community, and/or the proper operation of the facility.

Industrial Waste Ordinance

All of these requirements must be met before the pretreatment program can be approved. They can usually be met through the development of an industrial waste ordinance. No ordinance now exists that can be considered a truly typical ordinance. Each situation demands its own special features. However, existing ordinances may be modified to fit special needs. Ordinances, in general, may:

- Be self-contained (complete in itself with no separate documents required)
- Consist of simply stated general principles using separately published rules and regulations for enforcement
- Incorporate a permit system.

Smaller communities with few industries will often use a self-contained ordinance without permits. A general ordinance that is supplemented with rules, regulations, and permits is more flexible for larger cities.

Parts of an Industrial Waste Ordinance

General Provisions — includes purpose, policy, legislation and definitions

Regulations — includes prohibitive discharge standards, categorical standards, state requirements, excessive and/or accidental discharges, and any applicable local requirements and options

Fees and Charges — includes information applicable to administering a pretreatment program

Administration — includes reporting requirements, permits, monitoring, sampling, and required pretreatment facilities

Enforcement — includes provisions and responsibilities for accidental discharges, non-compliance situations, permit revoking, show-cause hearing, and legal actions

Penalties — includes civil penalities and fines

Legal Clauses — includes conditions and provisions for avoiding conflicts or establishing priorities with other laws

Effective Dates — includes calendar dates

Sample Sewer Connection Application Form

Sample Wastewater Discharge Permit

The development of an effective industrial waste ordinance is relatively simple if the boundaries of the wastewater management agency coincide with the boundaries of a political subdivision. However, if several political subdivisions are served the development can become complicated. The guidance and assistance of legal counsel are needed in either case.

Resources

The treatment agency must show sufficient resources (funds and personnel) to operate an effective program. User charges are required when construction grant funds are involved. There are various bulletins which help in estimating resources.

Pretreatment Program Personnel Requirements

Wastewater Flow (mgd)	*Number of Industrial Dischargers*	*Personnel Requirements*
5	small	2-4
	large	3-6
5-25	small	2-4
	large	4-8
25-50	small	4-6
	large	10-15
50	small	6-8
	large	10-15
100	large	50-100

Organizational Structure

The success of a pretreatment program depends on how it is developed and managed. Furthermore, as a condition for federal grants, the municipality must adopt a program that includes regular monitoring and enforcement of the national standards. For large treatment systems, a well-defined organizational structure having personnel with specialized training and qualifications may be necessary. This organization would have a separate industrial waste division with responsibilities for operating the industrial pretreatment program.

For small systems the workload imposed by the pretreatment program is considerably less than the activities of a large organization. Instead of an industrial waste division, the work can be handled within the existing organizational structure, or by supplemental contract services.

The Industrial Waste Survey and Management Procedures

The treatment agency is responsible for conducting an industrial waste survey on its system. This survey concerns the identification and classification of the industrial users.

The advisory group should help:

- **Identify the principal industrial users of the treatment system**
- **Gather information about the industrial processes that produce wastes, the quantity and characteristics of the waste produced, in-plant control procedures, and pretreatment operations.**

As a result of this survey, the treatment agency should develop an information system, and written procedures for enforcing federal and local effluent standards. Guidelines must be developed to:

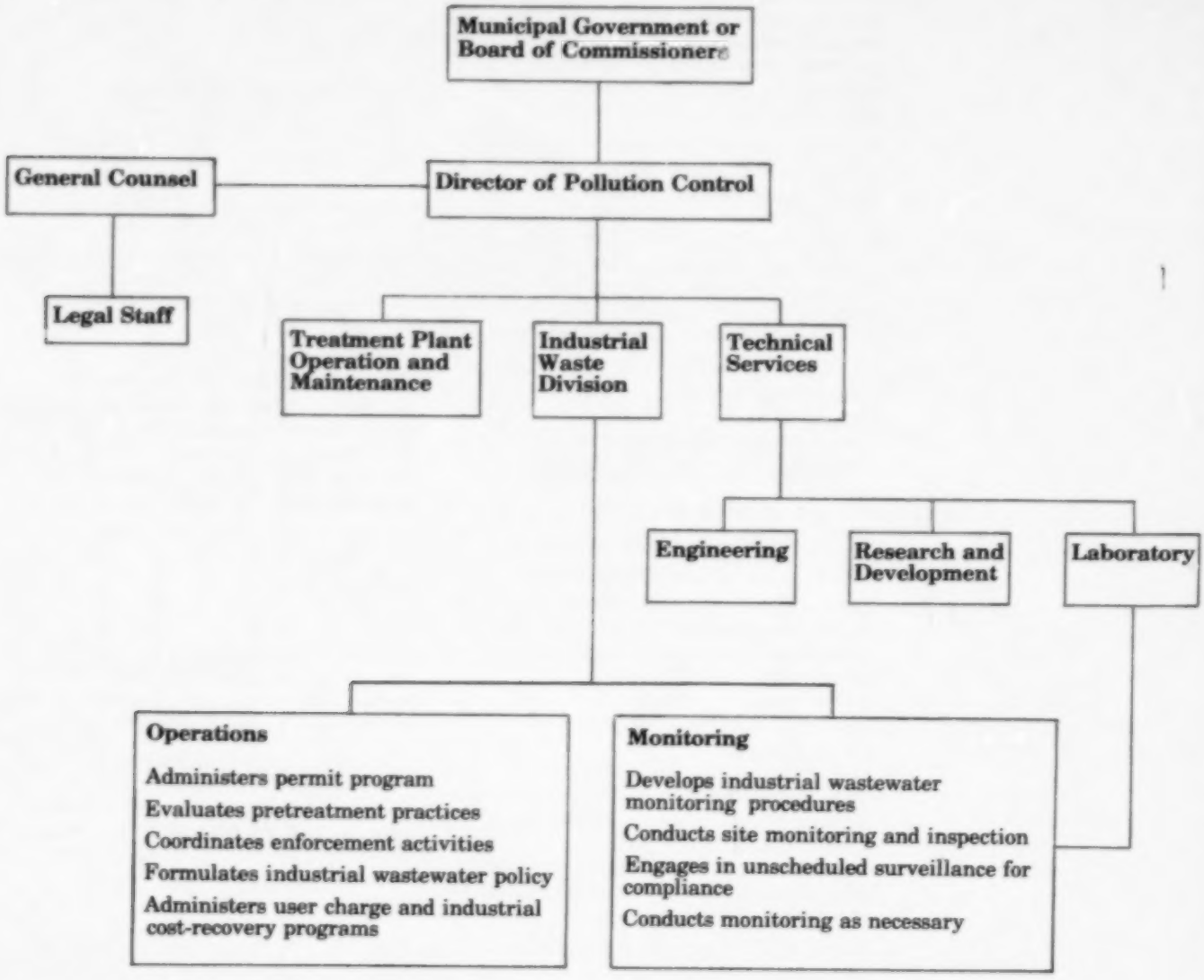
- Notify industrial users of specific categorical and prohibited discharge limits, including future requirements
- Analyze construction schedules of pretreatment works and self-monitoring reports submitted by the industrial users
- Respond to evidence of non-compliance by industrial users such as overdue reports and effluent violations
- Prepare an annual report of significant violations
- Set up a random sampling program to spot check the self-monitored reports.

The advisory group should be assured that the management procedures will provide the necessary information without adverse effects on the cooperation between industry and the community.

Revision of Categorical Standards

In some plants the treatment process may change a specific pollutant to a less harmful form. If the processes causing this alteration are not used generally in treatment plants, their effect may not have been considered in setting the nationwide categorical standard for this pollutant. In such a case, the treatment agency may apply for a revision of the categorical standard. This will allow more of the altered pollutant to be discharged, and reduce costs to industry with no environmental drawbacks. However, application and approval procedures for revised categorical standards are extremely stringent. They require extensive documentation, and are ineligible for federal funding.

Industrial Waste Enforcement
Organization of a
Large Municipal System



Variances from Categorical Standards

Categorical standards are set on an industry-wide basis. Specific industries may use a manufacturing process which is not considered in the development of a categorical pretreatment standard. In these cases where industrial processes are fundamentally different from other facilities, the categorical standards may be changed, thus making them more or less stringent than before. Any interested party, including the industrial user, may request a variance.

Approval of Pretreatment Program

After the pretreatment regulations are developed, they are transmitted to the proper regulatory agency for approval. The documents submitted must contain enough information to demonstrate the treatment agency's ability (financial, legal, and technical) to carry out the pretreatment program.

Enforcement

The treatment agency plays the major role in enforcing the compliance of pretreatment standards by industrial users. Where approved pretreatment programs exist, state and federal enforcement activities serve in a backup capacity.

The Clean Water Act, besides granting enforcement mechanisms and authority to the EPA and states authorized to issue NPDES permits, also *permits citizens to bring civil suits against the violators of pretreatment standards.* This consideration must be taken into account when developing a pretreatment program and during subsequent public notification.

The main vehicle for enforcing pretreatment programs is through the treatment agency's NPDES permit. Therefore, municipalities should:

- Develop sound pretreatment programs
- Enforce the requirements
- Give credit to industry for pollutant removal and sludge management.

Failure to enforce a pretreatment program in accordance with a permit schedule may preclude a municipality from receiving future construction grants.

Compliance

The state or the EPA develops compliance schedules as part of the NPDES permit. Completion dates for certain activities are based on construction grant award dates, pretreatment, and the industrial group to which the user belongs.

Regulatory limits on the time for developing a pretreatment program are:

- Approval of the program by the state or EPA within three years from the incorporation of a pretreatment compliance schedule in the municipal permit, or in accordance with the permit schedule and no later than July 1, 1983
- Approval of the program by the state or EPA by July 1, 1983
- Development of certain elements in the pretreatment program for the Step 2 (design) and Step 3 (construction) grant applications after December 31, 1980
- Approval by whatever more stringent time limit is imposed by the agency that issues the permit.

The treatment agency must develop procedures to insure compliance with the pretreatment program.

Summary

A publicly-owned treatment works should view the development and operation of a local pretreatment program as a chance to ensure reliability in operation of the wastewater treatment facility, and to provide a consistent and fair approach to local industry affected by General Pretreatment Regulations. The treatment agency should set as its goal the development of a sound pretreatment program with a firm commitment to enforcement.

Both the pretreatment program requirements and the industrial categorical standards are recent actions by EPA. In some areas they are still in the developmental stages. Changes in both areas are likely in the future.

The advisory group can help implement a satisfactory pretreatment program that controls toxic materials and other pollutants that are incompatible with wastewater treatment processes. Implementation of this program takes cooperation between industry and the agency. The public also must be involved.

The advisory group should evaluate the interests of the industrial users, the treatment agency, and the public as soon as facility planning begins. In this way the needs of all three groups can be built into the facility plan.

Industrial Pretreatment Ordinance

Grand Rapids, Michigan

Adapted from "Case History, City of Grand Rapids, Michigan, Program of Industrial Waste Control" by J. A. Breiner and H. H. Bouma. Pretreatment of Industrial Waste, Joint Municipal and Industrial Seminar, U.S. Environmental Protection Agency, Seminar Handout, 1978. pp. 453-488.

Grand Rapids, Michigan, is a city of 190,000 persons. Industry is highly diversified, and includes one of the largest concentrations of electroplating firms in the country. The Grand River which runs through the heart of the city is an important recreational resource for western Michigan.

Industrial Problem

During the late 1950's and 1960's industrial pollution of the Grand River created severe environmental problems, including periodic fish kills. As the environmental movement gained momentum during the mid 1960's, public attention in Grand Rapids was focused on the deteriorating state of the Grand River. In January of 1969, the Grand Rapids City Commission enacted the Comprehensive Water Pollution Control (Sewer Use) Ordinance, establishing effluent limitations for cyanide, heavy metals, as well as other provisions. Metal plating companies lobbied strenuously against any limitations, arguing that the cost of pretreatment would force them to relocate elsewhere. The quality of the water and the environment remained paramount, as the ordinance was adopted.

Ordinance Provisions

The city ordinance designates the management authority and legal authority necessary to implement and enforce sewage regulations. The ordinance subjects all users to the provisions, including a detailed definition of prohibited and restricted pollutants. Violations are designated as a public nuisance subject to penalty. The ordinance also permits the inspection of the sewer users' premises by properly authorized municipal employees.

Industrial Use Regulations

The regulations are divided into eight sections. R-1 specifies the inclusion of users in the industrial cost recovery system in which users are required to pay their share of construction costs. R-2 provides the authority to require the construction of a sampling manhole, if needed. R-3 designates the standard methods that are to be used for the analysis of effluent. R-4 calls for a grab sample as an acceptable sampling procedure for toxic wastes. R-5 establishes penalty charges. R-6 assigns responsibility for the construction, operation, and maintenance of pretreatment facilities. R-7 controls the disposal of septic tank wastes. R-8 requires the disposal of all residue sludges in properly licensed sites.

Enforcement Program

The effluent limitations stipulated in the Sewer Use Ordinance and accompanying regulations require significant changes in industrial waste disposal practices. At the time of enactment, the city recognized that compliance would be best achieved through cooperation between the city and local industry. Each company was granted a two-year variance to the ordinance. This allowed them to exceed effluent limitations, provided that the city felt that satisfactory progress was being made toward reaching the limitations. An additional six-month variance was given as a "shake down" period after which active enforcement began. The extension was granted due to the slower delivery of pumps, motors, and other electrical equipment needed to complete the pretreatment systems in every plant.

Compliance Procedure

Following the two and one-half year period, industries were subject to penalties for the violation of effluent limitations. A standard procedure was adopted by the city to ensure uniform processing of all violations.

Public Involvement

The news media played an important role in the enforcement program. During the two-year variance, the industrial progress reports made to the City Commission were given a great deal of attention by the press. Following the end of the variance period, the news media frequently publicized violations, resulting in great embarrassment to the industries involved. In fact, the negative publicity was more of a deterrent than were the monetary fines.

Surveillance Program

Industrial compliance with effluent limitations is insured by an effective surveillance program. It is set up as a full-time operation that is adequately staffed and equipped to conduct regular and routine effluent sampling in such a way that proper and reliable data results.

Collection and Disposal of Industrial Sludges

Sizeable quantities of both liquid and solid metallic sludges were generated once the pretreatment systems became operable. The creation of industrial sludges created a local demand for the transportation and disposal of these wastes. Disposal is under the jurisdiction of the Michigan Department of Natural Resources. Little attention was initially paid to disposal practices due to the lack of applicable legislation and experience.

Recently, however, with increased knowledge of sludge disposal, strict legislation was enacted and many sites were closed. At present, there is no licensed site in or near Grand Rapids for the disposal of industrial sludges. The cost for transporting and disposing of sludge has tripled or quadrupled as a result.

Effects of the Pretreatment Ordinance

Since the adoption of the pretreatment ordinance, there has been significant reduction in metals found in sewage influent and effluent.

Metal Concentrations

	Influent (mg/L)	*Effluent (mg/L)*
Before pretreatment	12-13	9-10
With pretreatment	2	1
Percent reduction	87	92

It appears that municipal treatment plants are capable of removing or treating low levels of metals, but efficiency decreases with increasing influent concentration.

Land application of sludge becomes more feasible in Grand Rapids as the metal content in sludges continues to decrease. The agricultural use of sludge could prove worthwhile both in resource recovery efforts and in reducing the costs of incineration.

Water Quality Improvement

By 1972 the flow of industrial wastes into the Grand River was slowed to a mere fraction of its former volume. In the spring of '72 the river was stocked with trout and salmon. Development of the fishing industry is only the beginning, and the future of the Grand River as a recreational resource is almost unlimited. Additional parks are being planned for development and many recreational activities are centered on or near the river. The public attitude toward the Grand River has been converted to one of appreciation and respect in just a few years. The situation continues to improve.

Need More Information?

Federal Guidelines, State and Local Pretreatment Programs. MCD-43, Vols. I, II, III. Washington, DC: U.S. Environmental Protection Agency, Office of Water Program Operations, 1977. 661 pp.

This document contains the most detailed information available on pretreatment programs. However, it is being revised in 1980. Volume I describes the program. Volume II provides information on pollutant removal, pass through, and interference with the municipal treatment plant. Volume III contains information on the 24 industries for which categorical standards are being developed. This document is available from the General Services Administration, Centralized Mailing List Services, Building 41, Denver Federal Center, Denver, CO 80225. Be sure to mention the title of the publication and the MCD number when ordering.

Guidance for NPDES States on Implementation of the General Pretreatment Regulation (40 CFR, Part 403), 1979.

This document may be procured from the Permits Division (EN-336), U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460.

Local Pretreatment Program Requirements and Guidance. Springfield, VA: Environmental Technology Consultants, Inc., September 1979. 135 pp.

This document serves as the basis for the preparation of this handbook. It represents the viewpoints of the consultants, and the requirements to be met by wastewater treatment agencies in developing an approved local pretreatment program. It is the most up-to-date document on the subject. It contains detailed information on each of the subjects discussed in the handbook. It can be obtained from Environmental Technology Consultants, Inc., The Executive Plaza, Suite 502, 6501 Loisdale Court, Springfield, VA 22150.

Glossary

Categorical Standards — effluent standards established for a particular industrial category.

Direct Discharge — discharge of an industrial waste other than to a publicly-owned treatment works.

Effluent — treated or untreated waste material discharged into the environment.

Incompatible Waste — a waste that will 1) upset a treatment works; 2) pass through a treatment works and cause a pollution problem; 3) be removed in the treatment works, but interfere with the disposal of the sludge from the treatment works.

Industrial Waste Ordinance — a common instrument of legal authority for enforcing pretreatment programs.

Influent — the raw wastewater entering a sewage treatment plant.

Joint Treatment — treatment of both municipal and industrial wastes in a publicly-owned treatment works.

Legal Authority — statutes, ordinances, contracts, or agreements through which a municipality enforces its pretreatment program.

Local Pretreatment Program — a procedure for regulating the discharge of industrial waste to a publicly-owned treatment works.

NPDES Permit — permit for discharge of a municipal or industrial waste issued by the EPA or state regulatory agency.

Pretreatment — treatment of an industrial waste before discharge to a municipal sewer system.

Pretreatment Effluent Standards — concentrations or amounts of toxic chemicals that may be discharged to publicly-owned treatment works.

Prohibited Wastes — wastes not allowed to be discharged to a publicly-owned treatment works.

Sanitary Wastewater — refers to wastewater produced in homes and industry, and separate from stormwater runoff.

Sedimentation — the settling out of solids in wastewater by gravity.

Sludge — the concentration of solids removed from sewage during wastewater treatment.

Toxic Chemical — one of a number of deadly substances; it appears on a list published by the EPA.

201 Planning — deals with the planning, designing, and construction of local wastewater treatment facilities.

208 Planning — water quality planning with a state, regional, and areawide scope.

☆ GPO : 1980 O - 326-604

Working for Clean Water is a program designed to help advisory groups improve decision making in water quality planning. It aims at helping people focus on essential issues and questions by providing trained instructors and materials suitable for persons with non-technical backgrounds. These materials include a *citizen handbook* on important principles and considerations about topics in water quality planning, an *audiovisual presentation*, and an *instructor guide* for elaborating points, providing additional information, and engaging in problem-solving exercises.

This program consists of 18 informational units on various aspects of water quality planning:

- Role of Advisory Groups
- Public Participation
- Nonpoint Source Pollution: Agriculture, Forestry, and Mining
- Urban Stormwater Runoff
- Groundwater Contamination
- Facility Planning in the Construction Grants Program
- Municipal Wastewater Processes: Overview
- Municipal Wastewater Processes: Details
- Small Systems
- Innovative and Alternative Technologies
- Industrial Pretreatment
- Land Treatment
- Water Conservation and Reuse
- Multiple Use
- Environmental Assessment
- Cost-Effectiveness Analysis
- Wastewater Facilities Operation and Management
- Financial Management

The units are not designed to make technical experts out of citizens and local officials. Each unit contains essential facts, key questions, advice on how to deal with the issues, and clearly-written technical backgrounds. In short, each unit provides the information that citizen advisors need to better fulfill their role.

This program is available through public participation coordinators at the regional offices of the United States Environmental Protection Agency.□

This information program was financed with federal funds from the U.S. Environmental Protection Agency under Cooperative Agreement No. CT900980 01. The information program has been reviewed by the Environmental Protection Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Environmental Protection Agency, nor does the mention of trade names or commercial products constitute endorsement of recommendation for use.

This project is dedicated to the memory of Susan A. Cole.